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ARMY TECHNICAL INTELLIGENCE REVIEW No 107 (SECRET)

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Cover picture .... East German RPG-7

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FOREWORD

In the article on the new Soviet self-propelled guns in the last issue of this review, mention was made of reports we had received of a new armoured command vehicle associated with them. We now have a good deal of intelligence on this vehicle, which comes in two models, and of yet another artillery associated AFV, a variant of the BMP. These vehicles are the subject of the first article in this review.

An article on Chinese infantry weapon design surveys the field and illustrates, in particular, their ability to adapt the best features of foreign designs to their own use.

The introduction of a new RPG-7V round provides yet another example of the Soviet determination to continue increasing the effectiveness of their older weapons despite the influx of new weapon systems.

Soviet electronic warfare capabilities are very considerable and articles dealing with the EW threat to Western battlefield radars and amplifying a previous article on the R-330 jammer will, we hope, be helpful to all concerned with the threat.

Other articles in this edition give a provisional assessment of the SA-8 SAM system, describe a new East German anti-personnel mine and take a fresh look at the major components of Soviet chemical defence units.

T B PALMER
Colonel
Tech Int (A)

1.Two New Soviet AFVs (SECRET)

Two new AFVs have gone into service with the Soviet Forces in Germany in the last year. One is a surveillance/OP version of the well known BMP mechanised infantry combat vehicle. The other is an armoured command vehicle, which is a completely new vehicle, but uses many of the same automotive components as the 122 mm SP gun introduced last year. Both of the new AFVs are associated with artillery.

BMP Surveillance/OP Variant

The new BMP variant is shown at Fig 1. The chassis and suspension are standard BMP-A but the top and the inside are completely different. The turret is much wider and set further back on the vehicle. It is only lightly armed with one 7.62 mm machine gun at the front of the turret. There are no passenger compartment hatches on the roof of this vehicle although there is still one small D-shaped hatch behind the turret.

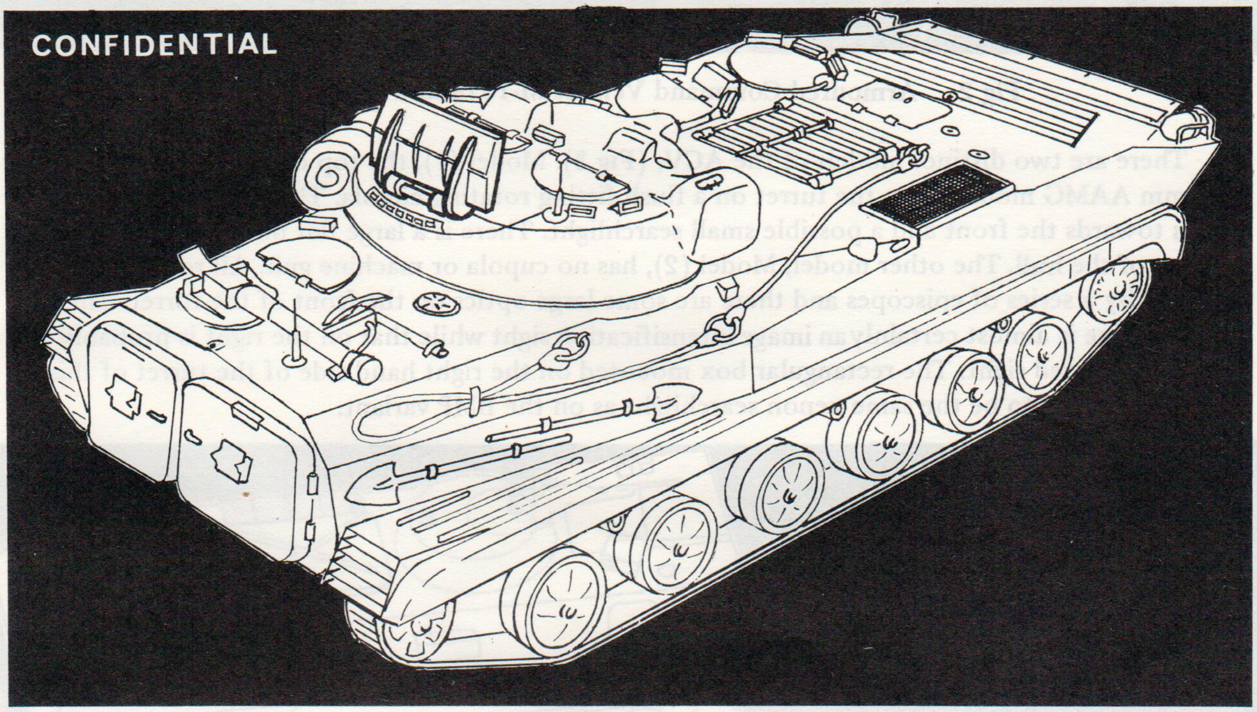

Fig 1. BMP Surveillance/OP Variant

There is a considerable amount of electronic equipment in the vehicle. In addition to two normal whip aerials, one on the turret and one on the rear of the hull, there is a hinged radar antenna which can be seen on the rear of the turret. This antenna is assessed to be for a surveillance radar with a probable range of 6–10 km. Additional surveillance equipment includes an image intensification sight similar to that on the standard BMP and a daylight sight possibly with an IR facility. The large box on the right hand side of the turret is probably a xenon searchlight.

This BMP variant has always been seen associated with towed or SP artillery. Because of this and also due to the type of equipment carried it is assessed as being an artillery surveillance or OP vehicle. It could however be used for general reconnaissance duties.

ARMOURED COMMAND VEHICLE M-1974

The ACV was first seen last year but it is only recently that good photography has enabled us to give an assessment of its characteristics and probable role. Fig 2 shows two ACVs with a 122 mm SP gun. As can be seen it is a large vehicle, rectangular box-shaped in outline, with a small truncated cone turret mounted towards the rear.

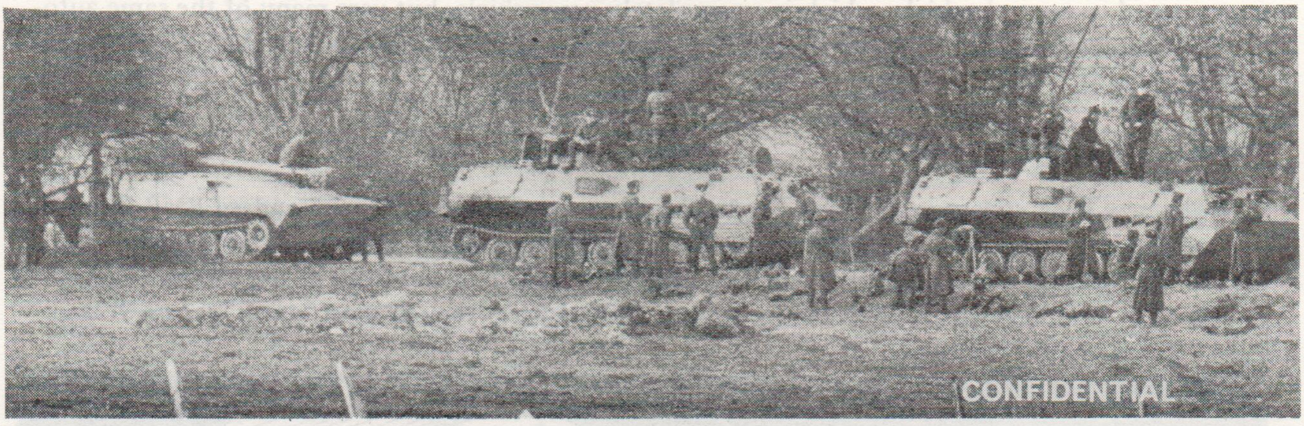

Fig 2. Armoured Command Vehicle M-1974 and 122 mm SP Gun

There are two distinct models of the ACV. (Fig 3). Model (1), the top one in the picture, has a 12.7 mm AAMG mounted on the turret on a flush fitting rotating cupola. The turret has four vision blocks towards the front and a possible small searchlight. There is a large flat box mounted on the top rear of the hull. The other model, Model (2), has no cupola or machine gun. All round vision is provided by a series of episcopes and there are some large optics on the front of the turret. The left hand of these is almost certainly an image intensification sight while that on the right is probably a daylight/infra-red sight. The rectangular box mounted on the right hand side of the turret of this model is thought to be the same xenon searchlight as on the BMP variant.

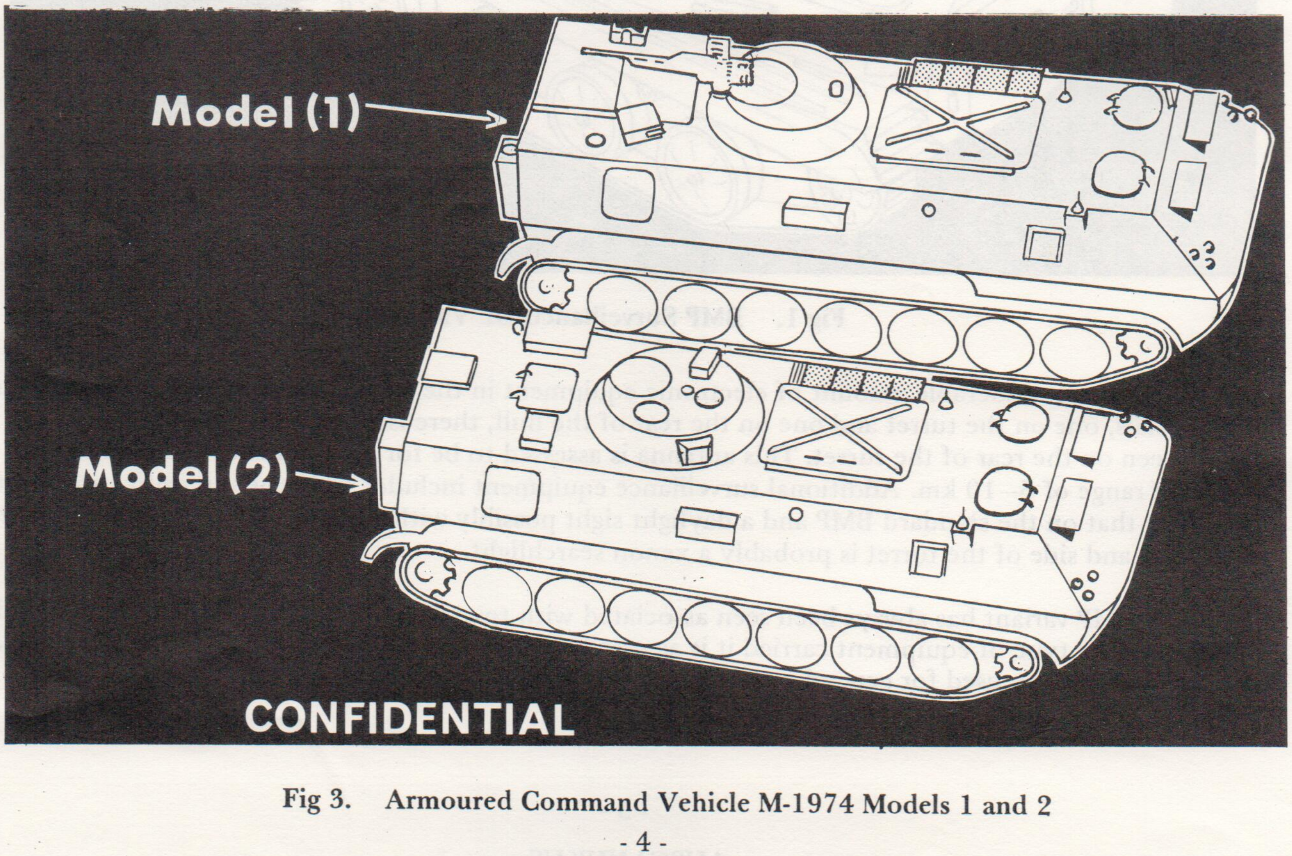

Fig 3. Armoured Command Vehicle M-1974 Models 1 and 2

Consistent with Soviet philosophy on interchangeability of components the new ACV uses many of the same automotive parts as the 122 mm SP gun. The engine is placed centrally and is a liquid cooled diesel. The transmission and drive sprockets are at the front and as in the 122 mm gun the flat track system is employed with seven road wheels and a torsion bar suspension. The vehicle swims with minimal preparation, being propelled in the water by its tracks.

The ACV has only light armour, probably no more than 15 mm thick, and steps have been taken to provide obliquities on the sides and front which are sloped. It can be assumed that full NBC filtration is provided.

These ACVs have been identified both with Soviet SP guns and by themselves. While it can be assumed therefore that they are the command vehicles for these SPs, the possibility remains that they may also have other command functions. When with artillery they appear to be issued on a scale of two per battery. Model (1) probably being used for the command post and Model (2) for the battery commander. Model (2) has been seen in Hungary where it is probably used in a general command role.

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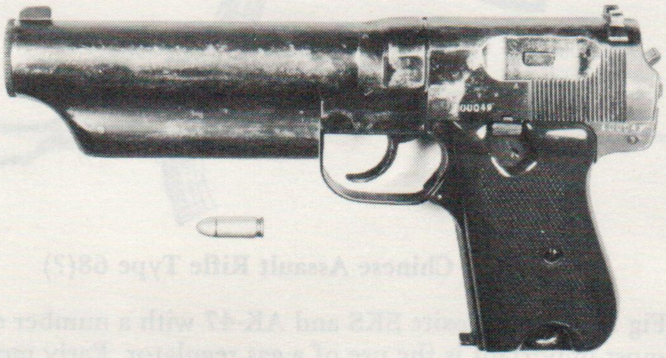
2. Chinese Infantry Weapon Design (SECRET)

All Chinese infantry weapons have until recently been copies of foreign equipment. Soviet, Czech, German and United States weapons have all been copied. The Chinese have however since the mid-1960s embarked on a programme of equipping their forces with a range of infantry weapons that are either a significant modification of a foreign weapon or locally designed. They do not have a highly developed R&D capability in this field. Their efforts have largely been directed towards re-designing foreign, mainly Soviet, weapons to make them more suitable for their operational theatre or to producing a composite weapon using features from many older Western equipments.

Specialist Commando Weapons

The Chinese have produced two specialist commando weapons, a silenced pistol and a silenced SMG, both of which have integral rather than detachable silencers.



RESTD.

Fig 1. Chinese Pistol Type 64

The Type 64 7.65 mm pistol (Fig 1) appears to be rather crudely finished, although the working parts are well made. All parts are machined indicating a rather limited production run. The pistol is capable of inflicting a lethal wound at 50 ft.

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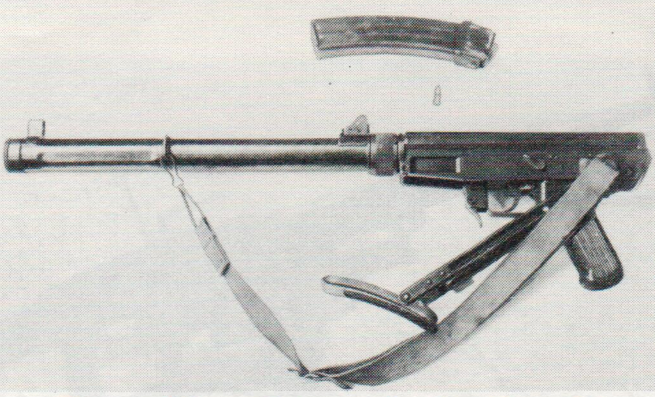

Fig 2. Chinese Sub-machine Gun Type 64

The silenced 7.62mm SMG Type 64 (Fig 2) is a far more professional looking weapon, although its performance is rather poor. It has complete flash suppression but ineffective noise suppression. The design is based largely on the old Soviet PPS-43 SMG and, as with all Chinese weapon design, has been considerably influenced by the very old Czech ZB-26 machine gun, a number of which were purchased by the pre-war Chinese Government.

Assault Rifles

The Chinese have to date produced a large number of SKS carbines and AK-47 assault rifles. In 1963 they produced the first model of a new 7.62 mm assault rifle, which is tentatively called the Type 63(?). Large scale production of a later model of this weapon possibly commenced in 1968 and it is this model, the Type 68(?), that has been captured in South Vietnam.

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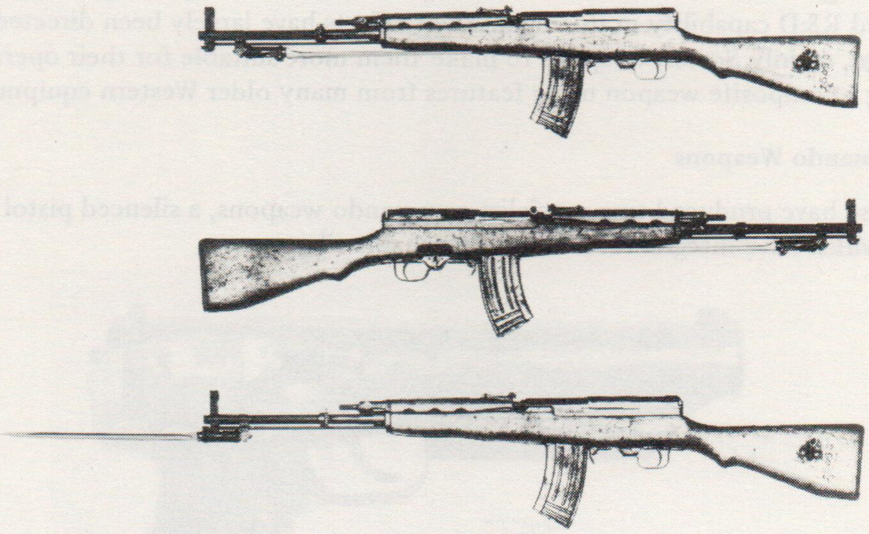

Fig 3. Chinese Assault Rifle Type 68(?)

The Type 68(?) (Fig 3) is a composite SKS and AK-47 with a number of additional design features, of which the most important is the use of a gas regulator. Early models of this rifle were machined, however extensive use of stampings is made in later models. In general it is a well made, effective but hardly original weapon. It is probably marginally more accurate on full automatic fire than the AK but it is questionable if this outweighs the easier handling characteristics of the AK in the jungle or in confined spaces.

Machine Guns

The only other small arm designed and produced in China is the Type 67 7.62 mm machine gun (Fig 4).

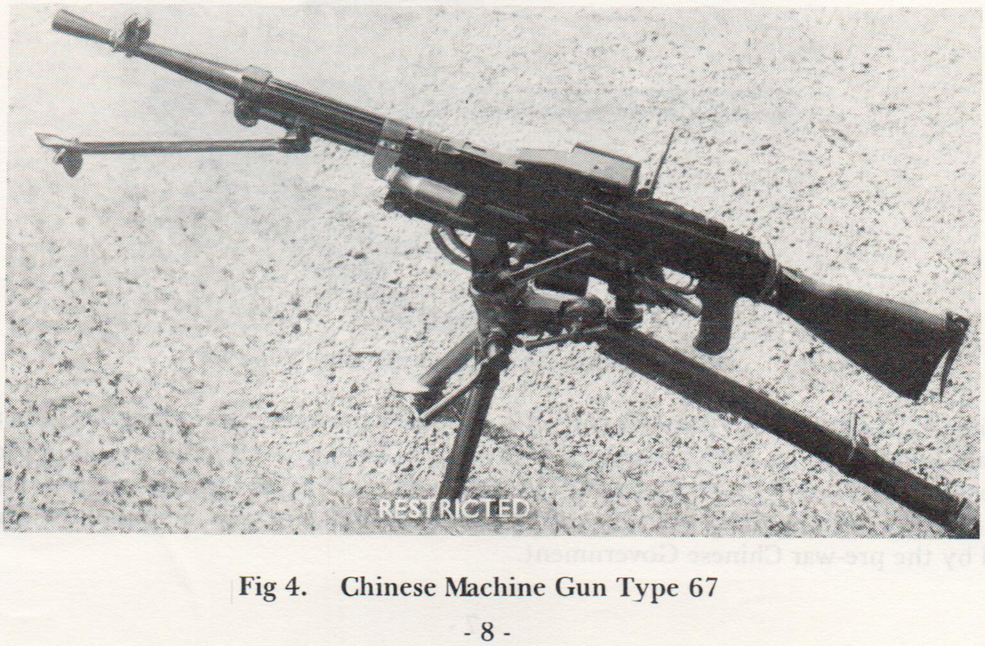

Fig 4. Chinese Machine Gun Type 67

This weapon is a classic example of the Chinese ability to extract features from a number of foreign machine guns to produce a composite weapon. Feed mechanism is copied from the Maxim, bolt and piston from the Czech ZB-26, trigger mechanism from the Soviet DPM, gas regulator from the Soviet RPD and barrel change system from the medium machine gun SG-43. The Type 67 is probably replacing the RP-46 as the company machine gun, it is some 7 lbs lighter than the RP-46 but there is no appreciable improvement in performance.

Infantry Anti-Tank Weapons

It is in the field of anti-tank weapons that the Chinese have produced their most significant modifications of Soviet equipment. The RPG-7V has been modified as a result of experience gained from its use in South Vietnam and designated the Type 69. The B-10, 82 mm recoilless gun, has been so extensively modified as to make their version, the Type 65, virtually an original design.

The RPG-7V fires fin stabilised ammunition which is very susceptible to cross winds, the rocket tends to head into wind as long as the motor burns and then when it cuts out drifts downwind. The difficulty in calculating the deflection required due to wind, rocket cut-out and speed of target each time the weapon is fired prompted the Chinese to produce an improved sight reticule and mounting. The Chinese sight mounting allows the operator to assess the windspeed and set this on the mounting prior to sighting, his only concern then is the speed of the target.

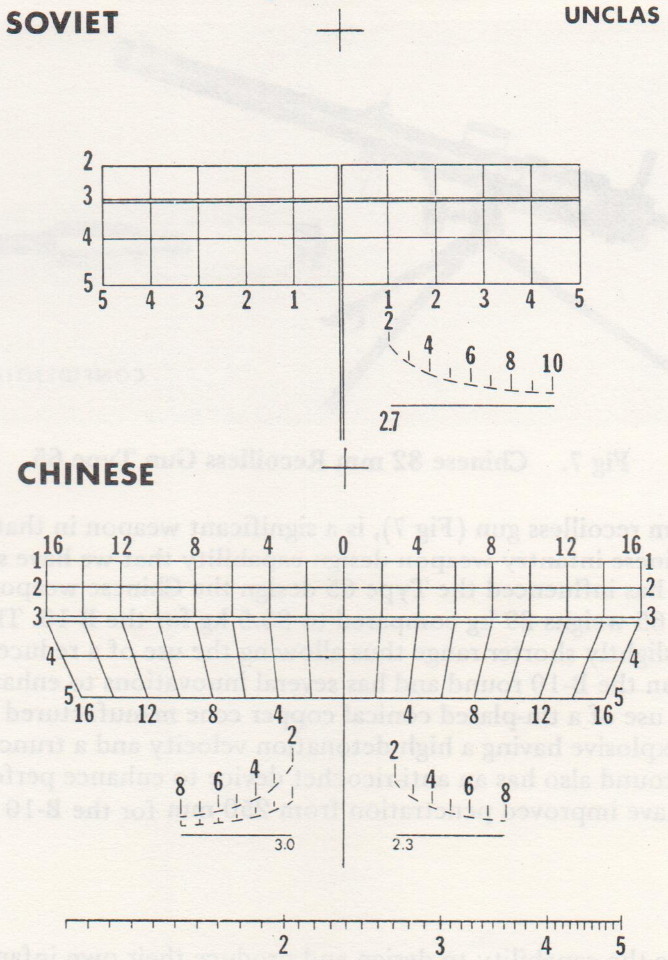

Fig 5. Soviet and Chinese Sight Patterns for A/Tank Weapons

The sight pattern is a considerable improvement over the Soviet sight (Fig 5), it compensates at longer ranges for the burn-out of the rocket motor provides two stadiametric rangefinders, one based on the average height of Western tanks the other of Soviet tanks.

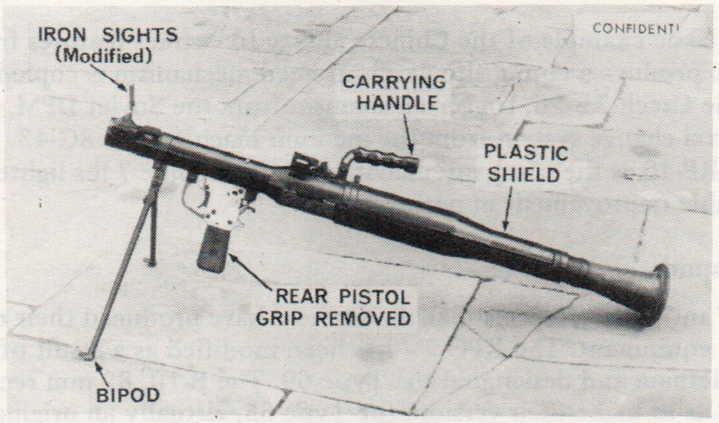

Fig 6. Chinese A/T Weapon Type 69

The major external differences in the Chinese and Soviet weapons are shown in Fig 6. The Chinese launcher, the Type 69, is slightly shorter than the Soviet and some 3 lbs lighter. The weight reduction has been achieved by using thinner tube walls and this has resulted in extreme heating in the tube after four rounds have been fired consecutively; the launcher thus has to cool for several minutes before firing can be resumed.

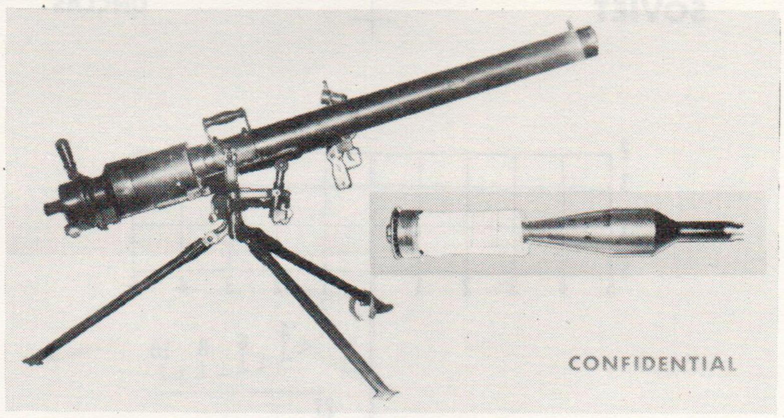

Fig 7. Chinese 82 mm Recoilless Gun Type 65

The Type 65, 82 mm recoilless gun (Fig 7), is a significant weapon in that it represents the most advanced example of Chinese infantry weapon design capability that we have seen to date. Although the obsolete Soviet B-10 has influenced the Type 65 design the Chinese weapon is a considerable improvement. The Type 65 weighs 29 kg compared to 85.5 kg for the B-10. This reduction has been achieved by accepting a slightly shorter range thus allowing the use of a reduced charge round. The ammunition is lighter than the B-10 round and has several innovations to enhance the penetration capability. These are the use of a tin-plated conical copper cone manufactured to uniform tolerances, a powerful RDX/WAX explosive having a high detonation velocity and a truncated conical disc for peripheral ignition. The round also has an anti-ricochet device to enhance performance against oblique armour. These features have improved penetration from 250 mm for the B-10 to 350 mm for the Type 65.

Conclusion

The Chinese do have the capability to design and produce their own infantry weapons, however such weapons are unlikely to use advanced technology. They have the ability to re-design the weapons of any nation to produce a weapon more suitable for their operational environment. It does however appear that they may in some cases be more concerned with having weapons in service that are obviously Chinese designed and produced than in having a copy of a better Soviet weapon.

3.Modified RPG-7V Ammunition (CONFIDENTIAL)

The new HEAT round for the infantry anti-tank grenade launcher RPG-7V has been identified. The earlier RPG-7V ammunition was designated PG-7, the new round is known as PG-7M.

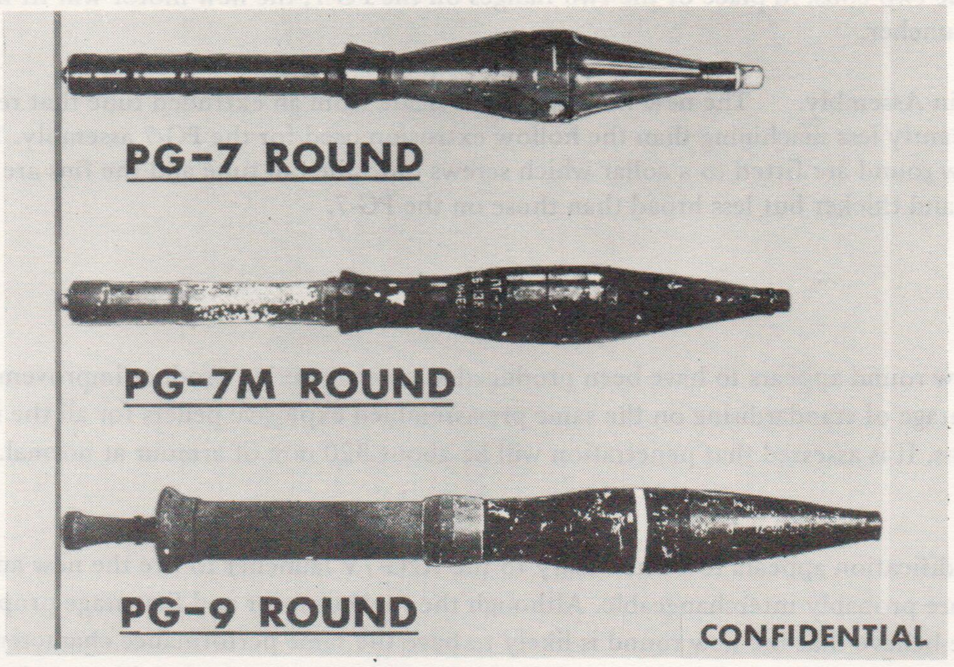

Fig 1. HEAT Ammunition for RPG-7V

Design

The PG-7M is based on the earlier PG-7 round and the 73 mm HEAT round PG-9, used by both the BMP main armament and the crew-portable recoilless gun SPG-9. The new round incorporates the warhead of the PG-9 with a modified PG-7 rocket motor and fin assembly.

The major differences between the PG-7M and the earlier PG-7 are:

a. **Warhead.** The cone diameter is reduced from 77 mm to 70 mm for the PG-7, however standoff is increased from 167 mm to 228 mm. A wave shaper continues to be employed. The warhead closely resembles the PG-9 warhead and the explosive cavities appear to be identical, thus allowing the use of the same pre-assembled explosive pellets in both types of ammunition. Standoff in the PG-7M is slightly less than in the PG-9 and will result in marginally reduced penetration. The same PIBD fuze and internal cone conductor appears to be used in the new round as is used in the PG-7.

b. **Rocket Motor.**

(1) **Nozzles.** The internal design of the nozzle section has been altered and is possibly a separate section. The use of rounded nozzles, indicates hot pressing or forging, thereby

simplifying production, as considerable machining was required in the production of the nozzles on the PG-7.

(2) **Motor Body.** The body material of the PG-7M motor is alloy and the walls are slightly thicker than on the PG-7 but the length is the same. The PG-7 propellant will not fit in the new motor. Although the new round has only one bore riding flange between the two ends, in place of the two flanges on the PG-7, the new motor will fit in the RPG-7V launcher.

c. **Fin Assembly.** The new fin assembly is made from an extruded tube that requires significantly less machining than the hollow extrusion used for the PG-7 assembly. The fins on the new round are fitted to a collar which screws onto the tail tube and the fins are possibly longer and thicker but less broad than those on the PG-7.

Assessment

The new round appears to have been produced as an engineering product improvement with the added advantage of standardising on the same pre-assembled explosive pellets for all the infantry anti-tank weapons. It is assessed that penetration will be about 320 mm of armour at normal.

No modification appears to be necessary to the RPG-7V launcher to fire the new ammunition and the rounds are probably interchangeable. Although the rocket motor and first stage propellant has been modified,we believe that the new round is likely to have the same performance characteristics as the earlier round. Any significant improvement in muzzle velocity and range would necessitate a new sight reticule. The new round may be marginally more accurate due to the reduced warhead diameter and improved fin design.

4. East German Anti Personnel Mine PMP-71 (CONFIDENTIAL)

During flooding on the East German frontier last winter some anti-personnel mines were washed out of the frontier minefields into West Germany. These mines were of a new type designated PMP-71/TNT. All the mines were destroyed where they were found by the West German border units.

The mine has a black rigid plastic case and weighs between 1 and 1½ kg. It is cylindrical in shape being 175 mm in diameter and 115 mm deep. The top of the mine overlaps the cylinder with a 15 mm wide lip and this lip has two brackets for anchoring the mine; in the centre of the top is the pressure plate for actuating the fuze. In the base are four indentations and a removable plate.

It is estimated that the explosive content of the mine is 100 grams of TNT. Methods for arming and disarming the mine are not known. Detection with conventional metallic mine detectors was very difficult and the mine could only be picked up at 100–150 mm; it therefore only contains a small amount of metal.

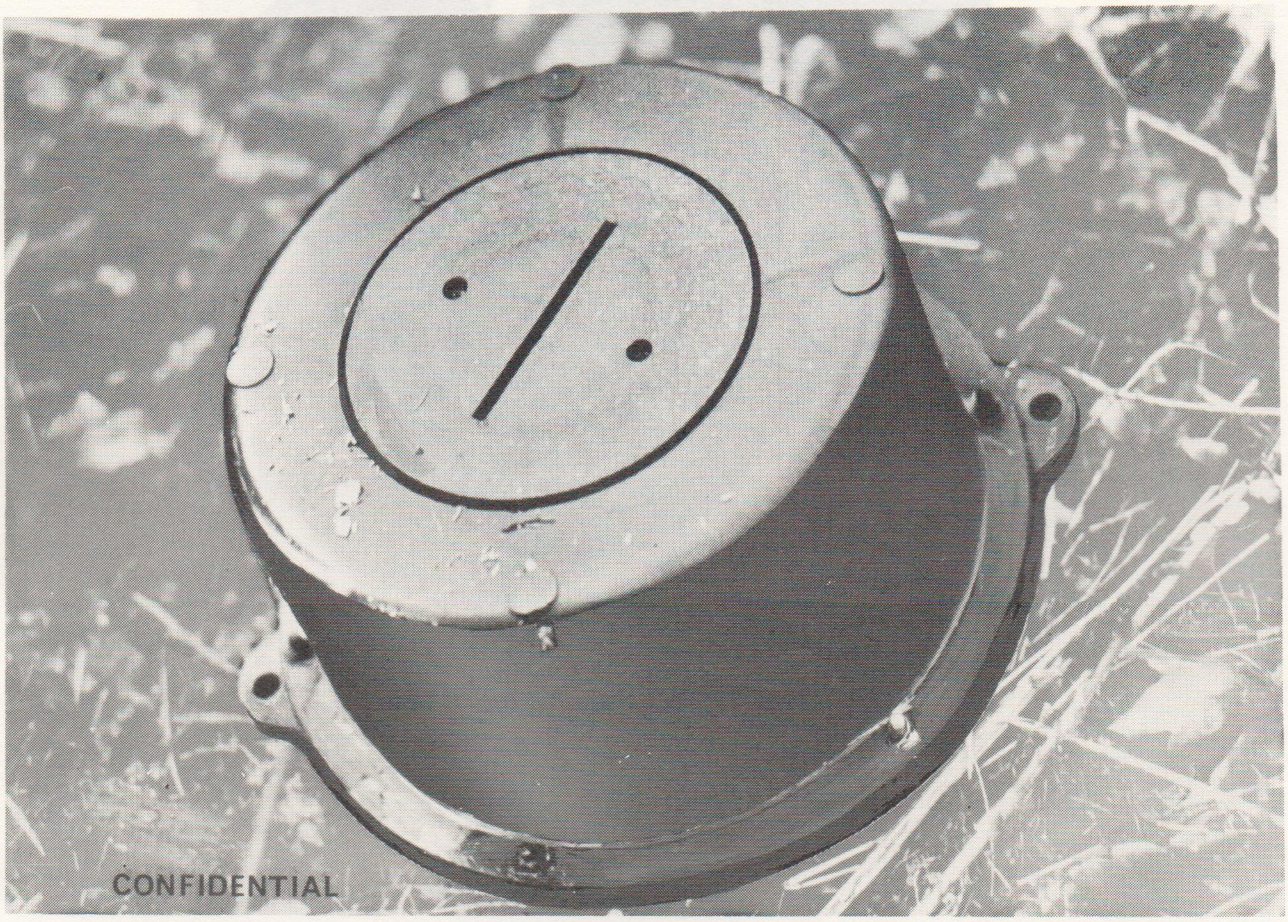

Fig 1. **PMP-71/TNT Upside down**

East German border guard practice is to lay these mines in three standard rows. The rows are 2 m apart, and the distance between mines in each row is 1 m. Holes for the mines are dug to a depth of about 300 mm; stakes are driven into the side of the hole and the mines are laid and anchored to the stake. Soil is then levelled over the top. The line of men laying the mines lie down about 1 m away from the line of mines and arm them by pulling the safety pin out of each mine with a piece of string;

finally the safety pin and the string is collected by the sergeant in charge, presumably to check that all the mines have been armed properly.

During trials the PMP-71/TNT anti-personnel mine was found to require modification. The modified mine, believed to be designated PMP-71/2, is now in production. It is believed to be smaller in diameter with the cylindrical body tapering towards the base like a truncated cone.

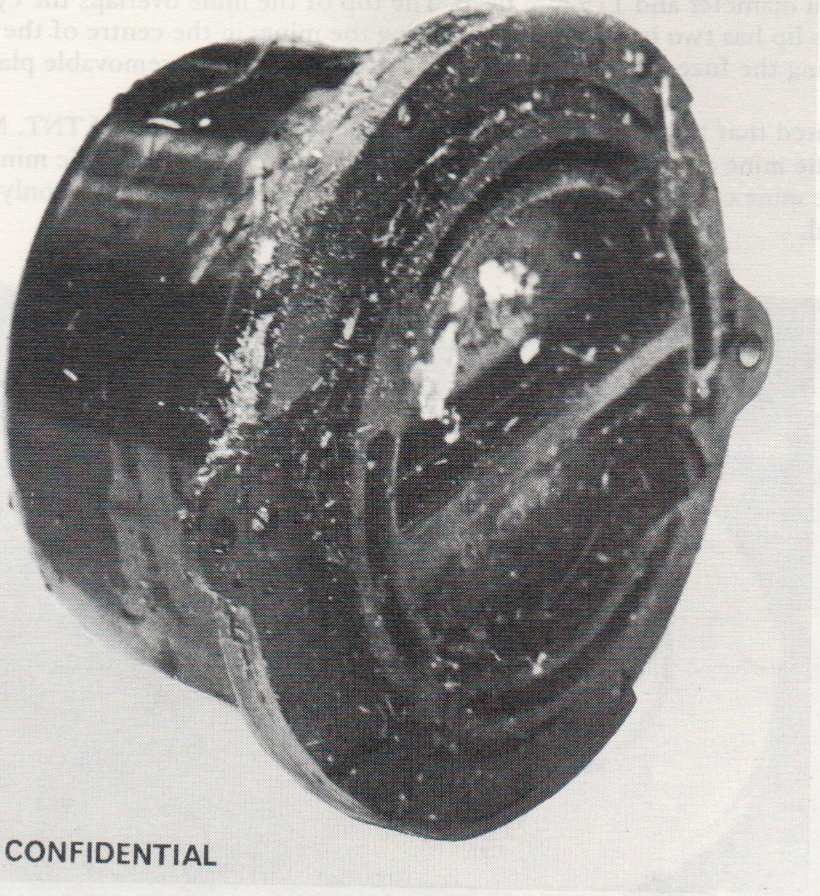

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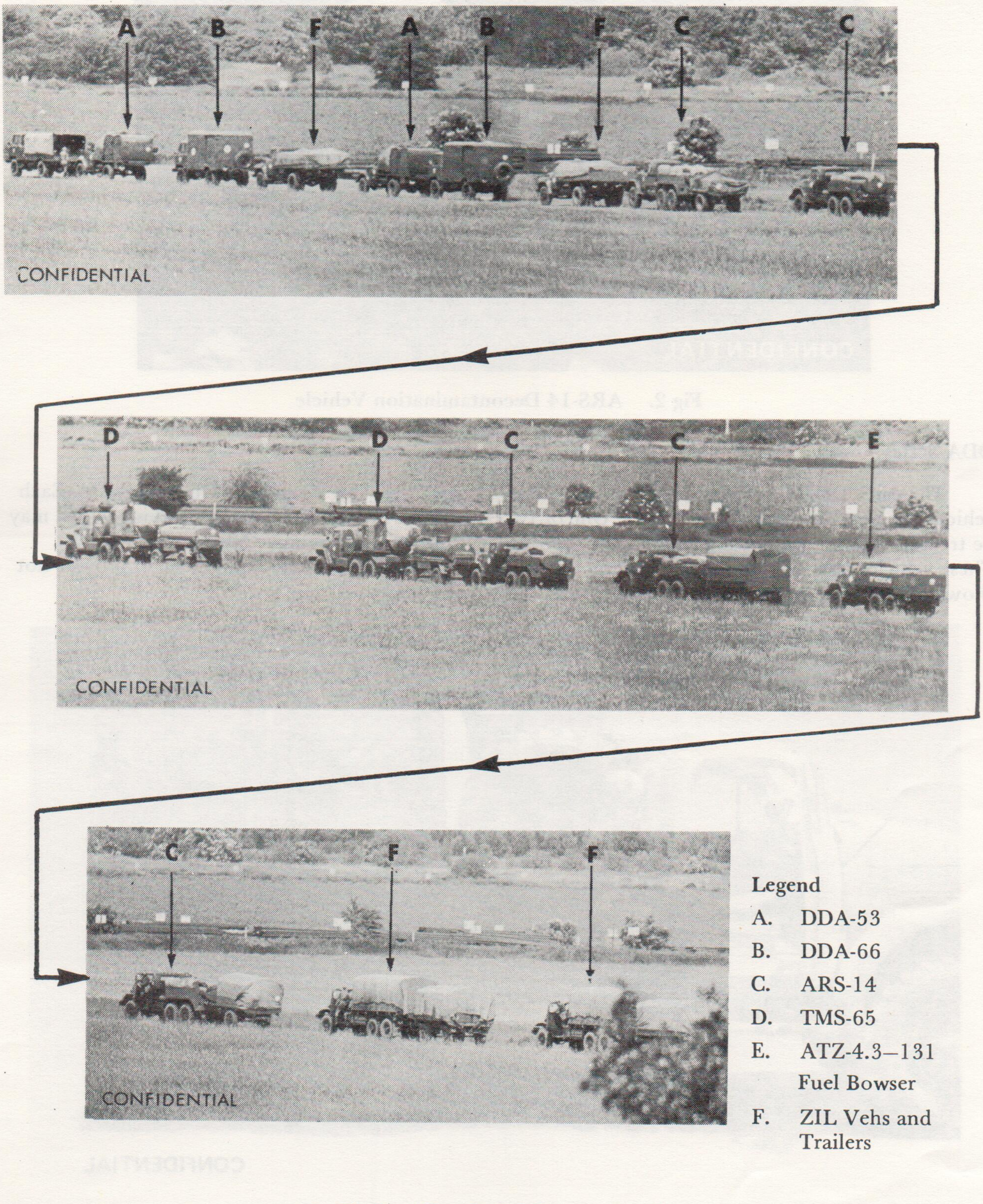
Fig 2. PMP-71/TNT Showing top of Mine

5.Soviet Chemical Defence (CONFIDENTIAL)

An interesting view of a chemical defence sub-unit is shown below (Fig 1). This may be an opportune time to take a fresh look at the major equipments of chemical defence units in the Soviet Army.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Legend

A.	DDA-53
B.	DDA-66
C.	ARS-14
D.	TMS-65
E.	ATZ-4.3–131 Fuel Bowser
F.	ZIL Vehs and Trailers

Fig 1. Chemical defence sub-unit

ASR-14 (Fig 2)

This 2500 litre bowser mounted on the ZIL-131 6x6 3½ ton truck is an improved version of the ARS-12. It is used to carry or pump water, to mix decontaminant solutions, to hose, spray and brush contaminated AFVs and weapons and to decontaminate ground by spraying

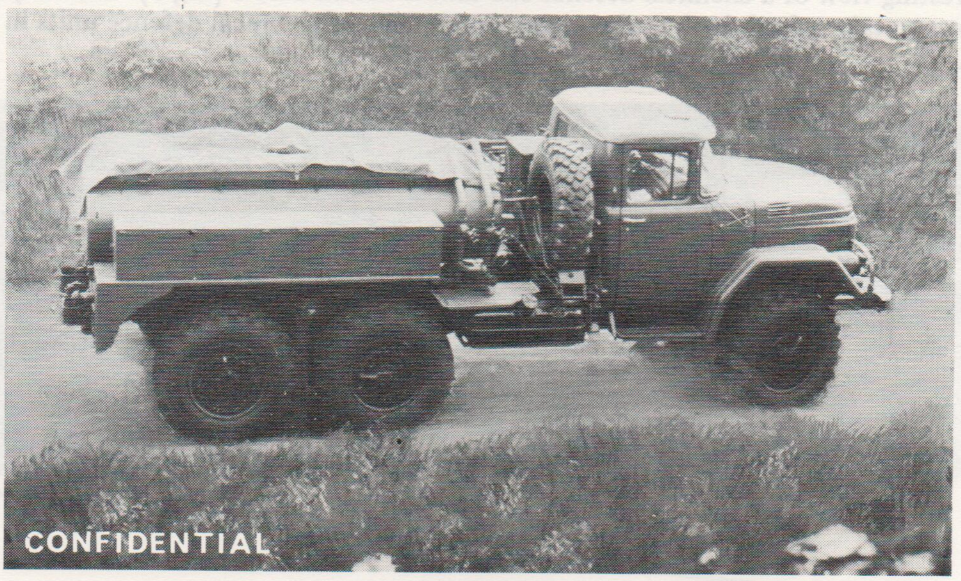

Fig 2. ARS-14 Decontamination Vehicle

DDA Series

The early DDA-53 (Fig 3) is being replaced by the DDA-66 (Fig 4) and the DDA-2 (Fig 5). Each vehicle operates on the same principles. One or two autoclaves are used to contain clothing which may be treated with steam, hot decontaminant solution or disinfectant to remove NBC contamination. These vehicles also may be used in conjunction with special tents and spray equipment to provide hot showers for troops either for decontamination or normal hygiene.

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Fig 3. DDA-53 Clothing Decontamination Vehicle

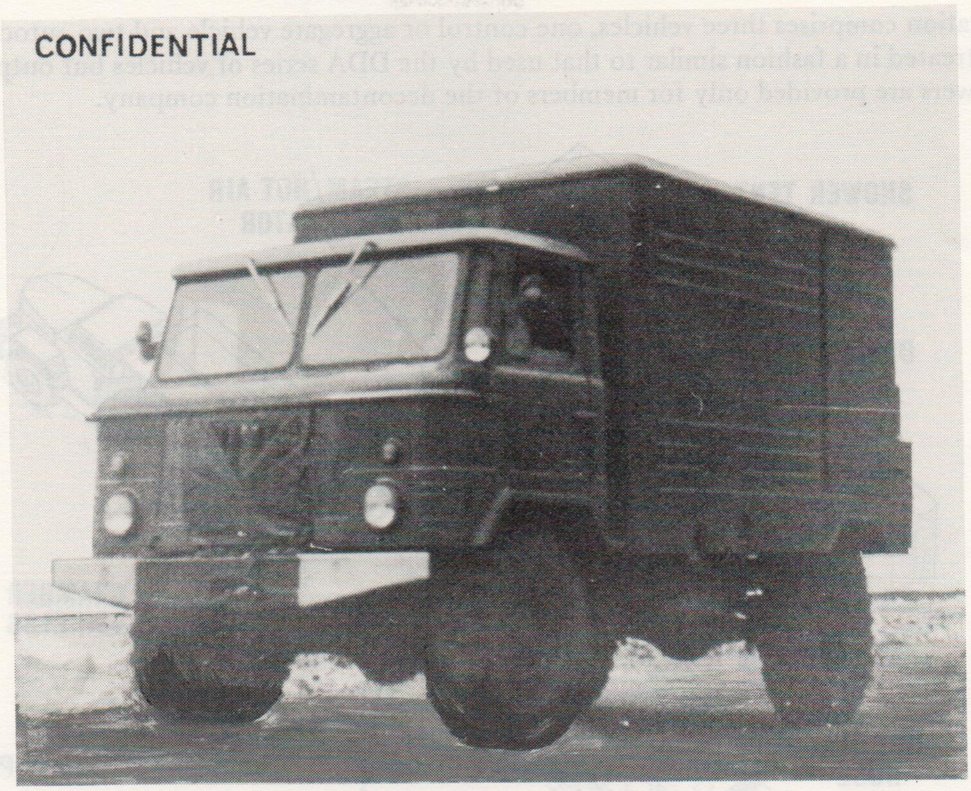

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Fig 4. DDA-66 Decontamination Vehicle

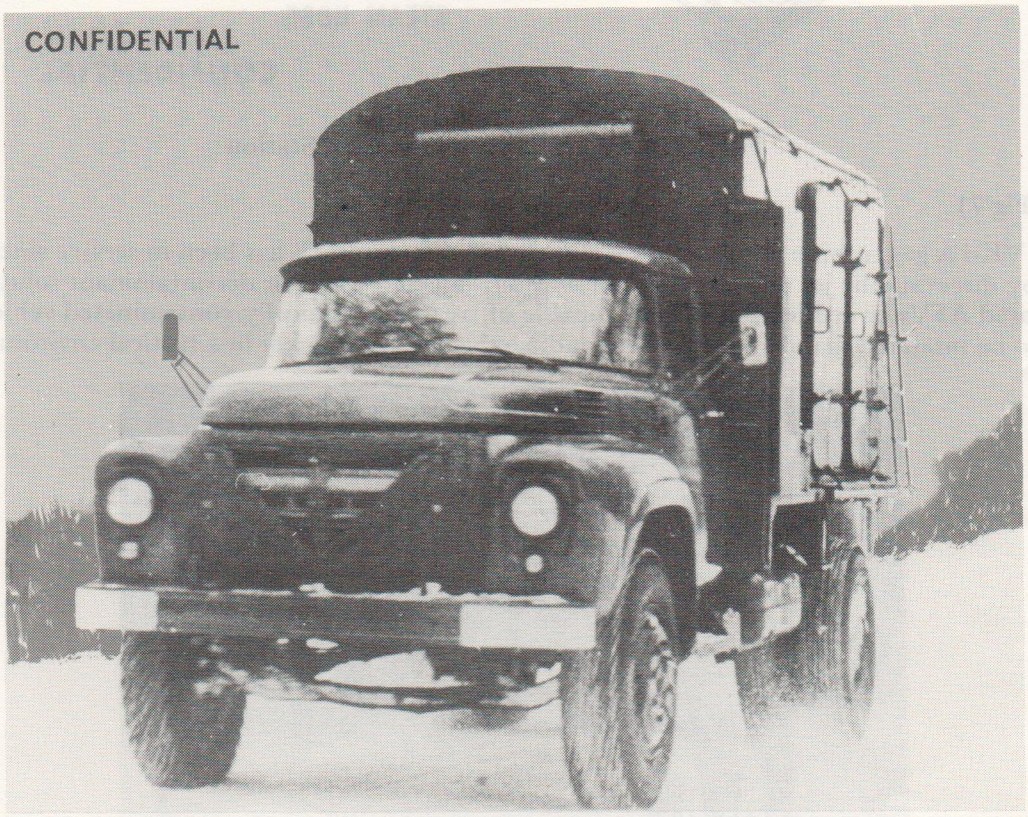

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Fig 5. DDA-2 Decontamination Vehicle

AGV-3M Decontamination Station (Fig 6)

This station comprises three vehicles, one control or aggregate vehicle and two autoclave vehicles. Clothing is treated in a fashion similar to that used by the DDA series of vehicles but output is much higher. Showers are provided only for members of the decontamination company.

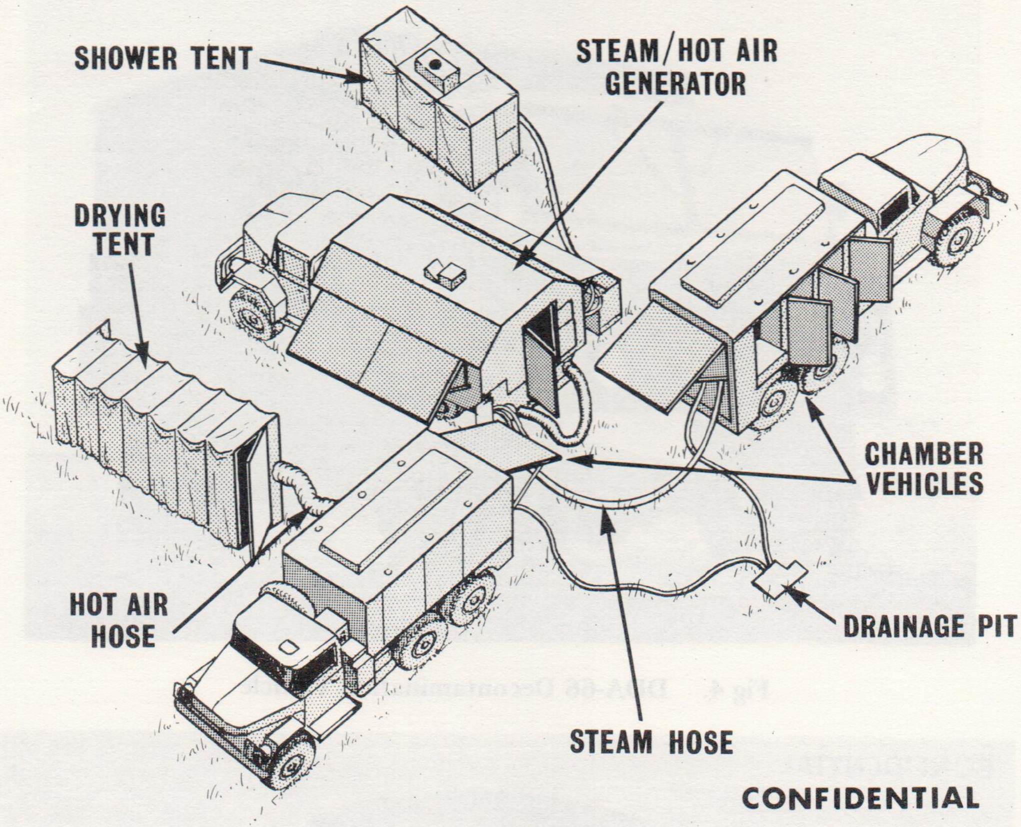

SHOWER TENT
STEAM/HOT AIR GENERATOR
DRYING TENT
CHAMBER VEHICLES
HOT AIR HOSE
DRAINAGE PIT
STEAM HOSE
CONFIDENTIAL

Fig 6. AGV-3M Decontamination Station

TMS-65 (Fig 7)

This VK-1A gas turbine mounted on a URAL-375 4½ ton truck has been in service since 1968. It operates by directing the jet exhaust, with or without injected water or decontaminant solution, at contaminated AFVs or artillery. Although capable of treating chemically contaminated vehicles, it is believed to be intended mainly for removing radioactive fallout quickly in a tactical environment.

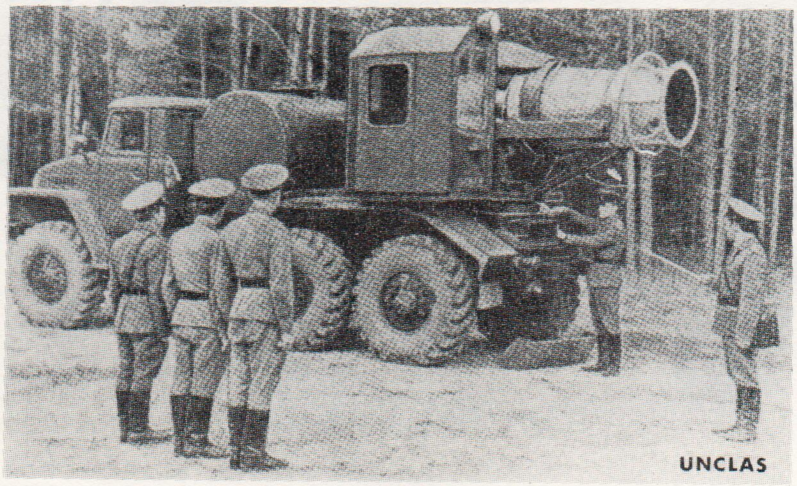


Fig 7. TMS-65 Decontamination Device

6.The SA-8 SAM System (SECRET AUSCANUKUS)

Introduction

The present weakness in the Soviet tactical low level SAM air defence which is based on the SA-6, SA-7 and SA-9 SAM systems, is against fast targets flying below 100 m. A new Soviet SAM system SA-8 is expected to fill this gap.

It is believed that the system has been under development for some years and that it could soon appear with the Soviet forces in Eastern Europe.

System Description

At the present time photography of the system and details of its performance are not available. However the operational requirement is similar to that of the western systems ROLAND (Figure 1) and CROTALE (Figure 2).

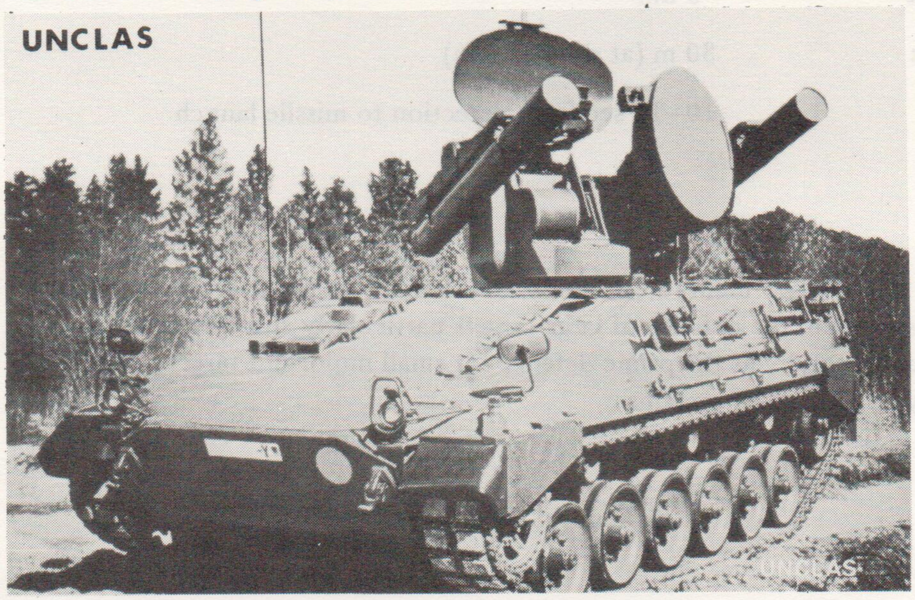
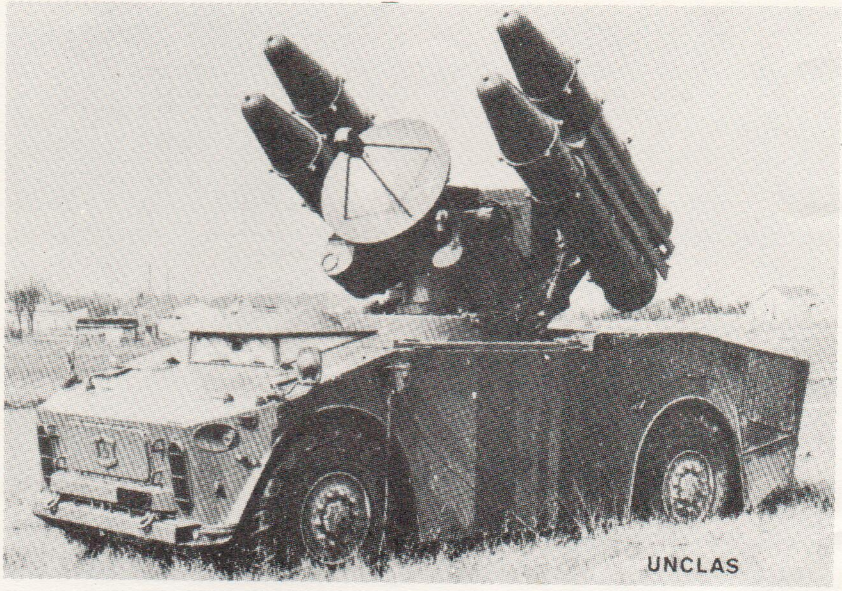


Fig 1. ROLAND
Firing Unit

Fig 2: CROTALE
Firing Unit



It is likely that the SA-8 system will incorporate some of the better characteristics of each of these systems. Based on this, we could expect about four missiles mounted, with a fire control and an acquisition radar, on wheeled vehicle.

System Performance

A provisional assessment of the performance of SA-8 based on comparisons with the western systems could give the following:

Maximum range	10 km
Maximum altitude	5 km
Minimum altitude	30 m (at short ranges)
Reaction time	10–12 sec from detection to missile launch

Employment

The SA-8 system is likely to have two main roles. Firstly as a short range point defence weapon integrated with a longer range system in the defence of large targets particularly susceptible to low level attack, such as airfields, and secondly as the prime defence for small important targets which cannot be protected effectively by area cover systems.

7. The EW Threat to Western Battlefield Radars (SECRET AUSCANUKUS)

Introduction

Within NATO, battlefield radars play a large part in the process of surveillance and target acquisition. 1st British Corps, has ZB 298, the Infantry Company Radar, Cymbeline, the Rapier surveillance radar and the Thunderbird radars.

These radars are vulnerable to enemy action in a variety of ways. In common with all other types of equipment, they can be observed by optical or electronic means and then engaged by artillery, air strikes or direct fire weapons. Secondly, because they are required to pass information by radio to be effective, the radio emissions can be intercepted, located, jammed and/or engaged by artillery or air strikes. In addition, because they are active, these radars can be detected by interception of their emissions and then jammed or located for subsequent engagement by artillery or air strikes including radar seeking weapons.

It is believed that it is Russian policy to intercept and DF battlefield radars rather then to jam them. However they have the capability to do either or both.

Equipment

Radar Intercept Equipment

Two radar intercept equipments are in service with the Soviet army – TWIN BOX and POLE DISH. Both are passive equipments and are deployed with Radar Jamming Units and Army Reconnaissance Units. Both equipments cover the frequency bands in which almost all our battlefield radars work.

TWIN BOX (Fig 1) is not very accurate and its assessed function is an order-of-battle intercept station. It is mounted on a GAZ-66 box-bodied vehicle.

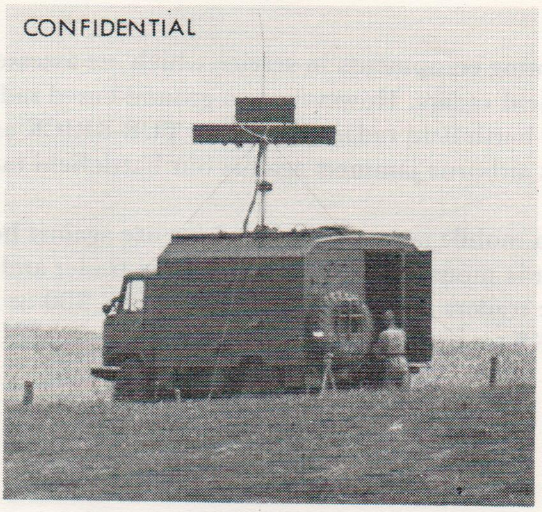


Fig 1. TWIN BOX Intercept Equipment

POLE DISH (Fig 2) is deployed in threes and, together with a computer control van, these equipments form the radar location system NRS-1. This system is highly accurate, being capable in good conditions of locating a radar to within a rectangle 120 m by 240 m at a range of 25 km. This is accurate enough to allow subsequent predicted fire by such a weapon as BM-21.

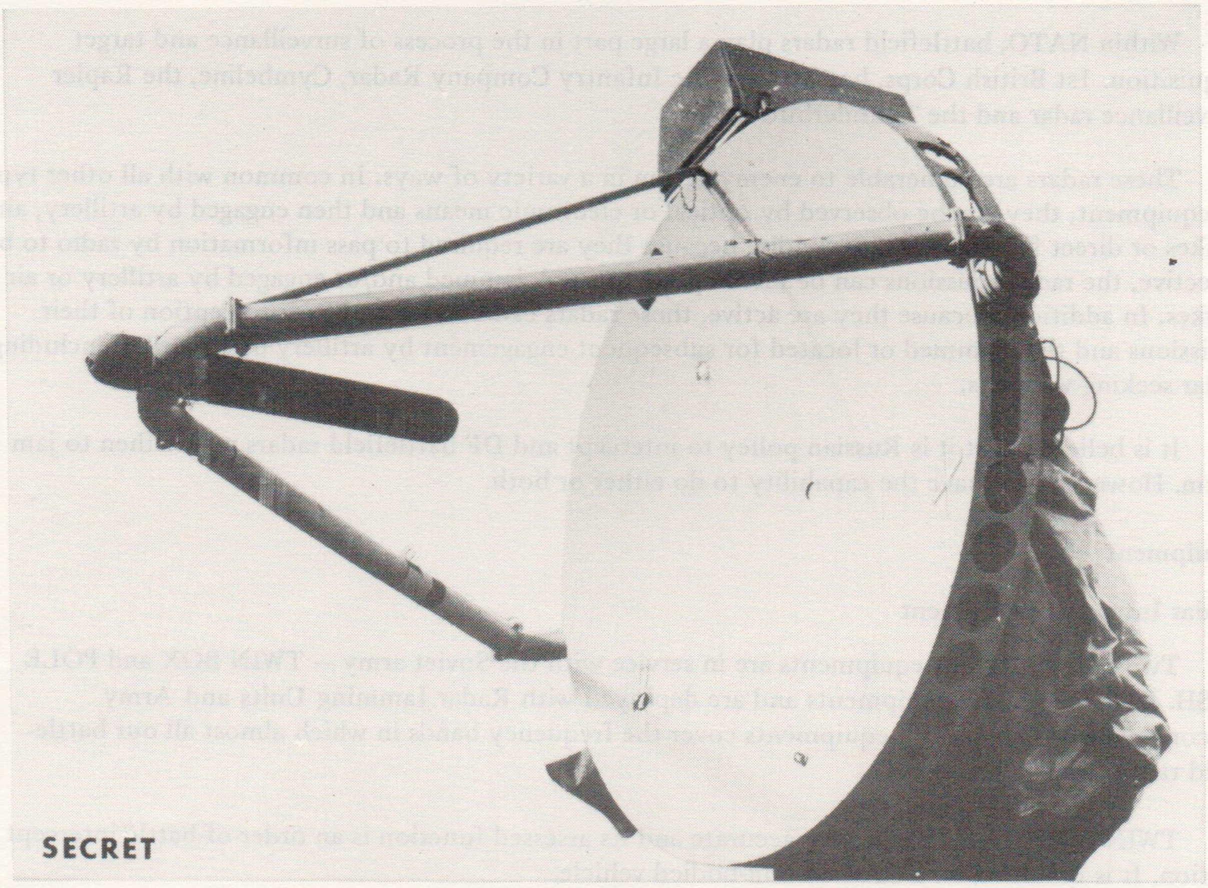


Fig 2. POLE DISH Intercept Equipment

Radar Jamming Equipment

There are no radar jamming equipments in service which are assessed as having a primary role against ground-based battlefield radars. However, two ground-based radar jammers are capable of jamming the majority of our battlefield radars. These are TUB BRICK and KING PIN. In addition, the Soviets could use various airborne jammers against our battlefield radars.

TUB BRICK (Fig 3) is a mobile jammer, designed for use against bomb and aircraft navigation radars. The intercept receiver is mounted in one SON-9 type trailer and the jamming transmitter in another similar trailer. These trailers are towed by either a MAZ 500 or a URAL 375. It is normal for four pairs of TUB BRICKS to operate together.

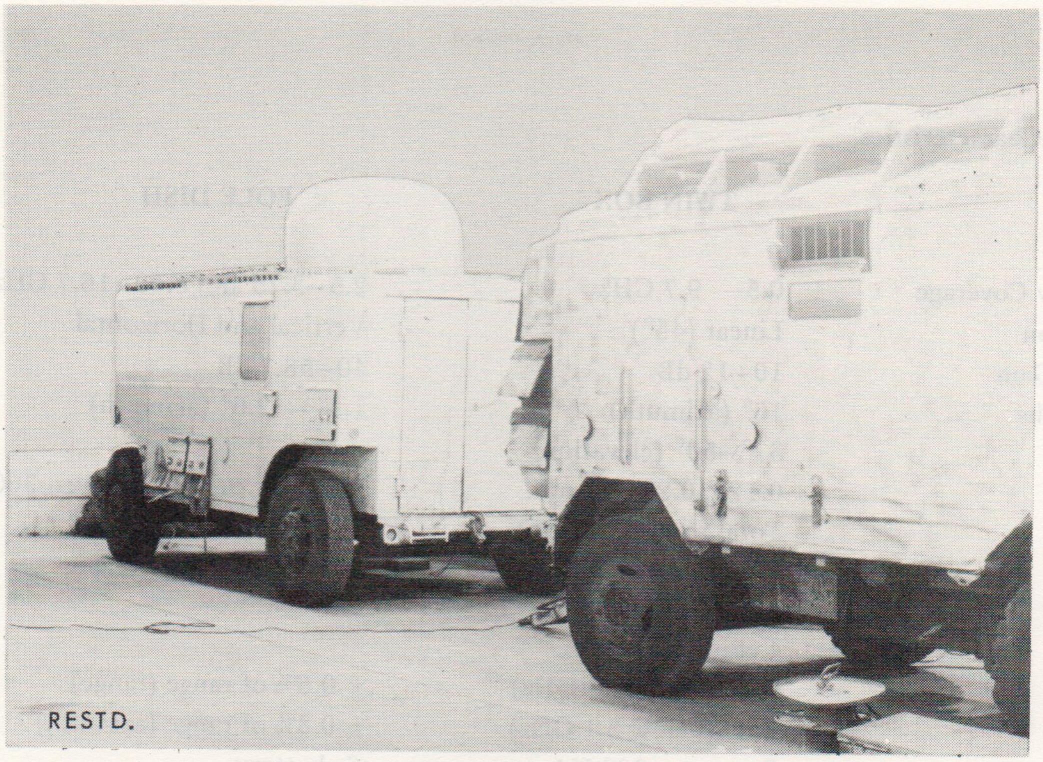


Fig 3. TUB BRICK Mobile Jammer

KING PIN (Fig 4) is a recent introduction. Both the receiver and transmitter are mounted in one trailer which is towed by a URAL 375. The whole equipment appears to be very well designed. It is assessed as having a primary role against aircraft radars.

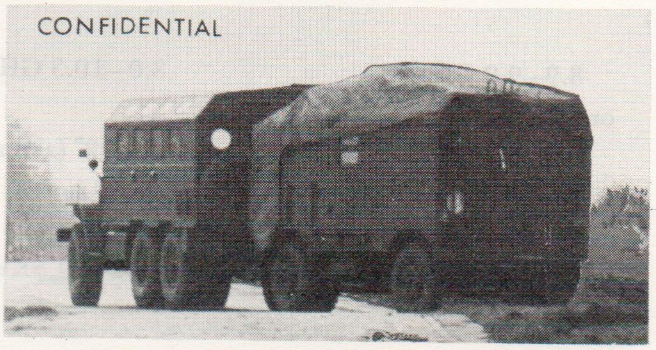


Fig 4. KING PIN Mobile Jammer

Performance

In ideal conditions, these jamming and intercept equipments can achieve excellent results. However, against land-based targets, their performance will be degraded to a certain extent by the terrain, by good siting of their targets and by the requirement for repeated movement. For example, the accuracy of POLE DISH against a radar sited behind two crests could be reduced from ± 0.1 degrees to ± 1 degree. Obviously sensible operating procedures by our radars could reduce the threat still further.

The Future

It is expected that several new electronic warfare equipments will be introduced by the Soviets in the near future. They are likely to be well-designed and purpose-built like KING PIN, and to be introduced in large numbers. Whether their policy of intercepting and locating radars rather than jamming them will change remains to be seen.

Technical Characteristics

	TWIN BOX	POLE DISH
Frequency Coverage	0.5– 9.7 GHz	2.5–3.75 and 8.09–16.7 GHz
Polarisation	Linear (45°)	Vertical and Horizontal
Antenna Gain	10–12 dB	40–58.7 dB
Beamwidths	10° (azimuth) 37°–50° (elevation)	1.3° – 2.6° (azimuth)
Scans	0.125, 0.25, 0.5 rpm Total rotation of 480°	Manually or motor driven 360°
Antenna	Top box 3 dipoles Lower box 9 dipoles 4 elliptical horns	Parabolic Dish 1.05 m
Accuracy	± 4° (above 3.1 GHz) ± 6° (below 3.1 GHz)	± 0.6% of range (range) ± 0.3% of range (azimuth)
Power Supply	Generator 900 VA 127/220v 60 Hz	6v battery

	TUB BRICK	KING PIN
Frequency Coverage	8.9–9.9 GHz or 8.4–9.4 GHz	8.0–10.3 GHz
Beamwidth	5.5–6°	8°–12° (azimuth) 25°–40° (elevation)
Polarisation	Horizontal or Vertical	Variable
Antenna Gain	27 dB	17–21 dB
Effective Radiated Power	66KW/MHz	8.35–14.5KW/MHz

8. R-330 VHF/FM Jammer (SECRET AUSCANUKUS)

Introduction

This article is intended to amplify the article on the R-330 jammer published in the SECRET ATIR No 106 of January 1975, and discusses the ability of the R-330 to jam more than one channel simultaneously.

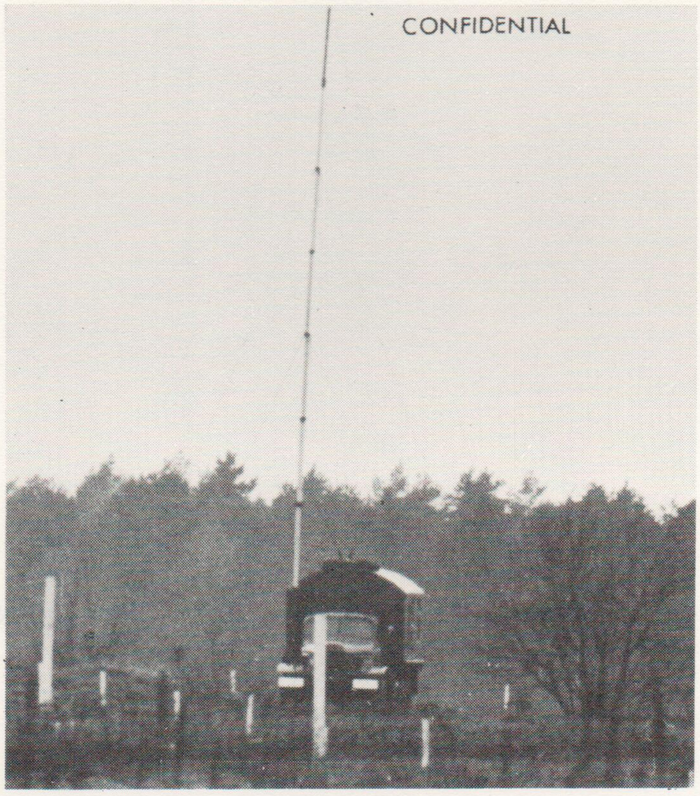


Fig 1. R-330 VHF/FM Jammer

Modulation System

One, five or fifteen channels can be jammed at a time. If the five or fifteen channel modes are chosen each channel has to be a nominal 100 kHz away from the next so that the total jammed bandwidth is either 400 or 1400 kHz. Other spacings are not possible and the flexibility of the equipment is limited to this extent. Each channel is frequency modulated to an approximate bandwidth of 20–30 kHz by a single noise source. The outside limits covered by the five or fifteen channels can be anywhere between the equipment limits of 20 or 60 MHz.

Power

Selecting the five or fifteen channel mode does not alter the power available, so the power in each tooth is considerably less than if jamming is taking place on a single channel. The limitations of the modulation system described therefore wastes power and reduces the effective range when in a multi-channel mode and offers possibilities of providing counter-measures to minimise the effect of the jamming.

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